WE CLAIM:

1. A device for acoustically assessing the contents of a plurality of fluid reservoirs, comprising:

a plurality of reservoirs each comprising a solid surface, wherein a portion of each reservoir is adapted to contain a fluid;

an acoustic radiation generator for generating acoustic radiation;

a means for positioning the acoustic radiation generator in acoustic coupling relationship to each reservoir such that acoustic radiation generated by the acoustic radiation generator is transmitted through the solid surface and the portion of each reservoir adapted to contain a fluid; and

an analyzer for analyzing a characteristic of the transmitted acoustic radiation, wherein the analyzer is positioned to receive the transmitted acoustic radiation.

2. The device of claim 1, comprised of a single acoustic radiation generator.

3. The device of claim 1, wherein the reservoirs are removable from the device.

4. The device of claim 1, wherein the reservoirs represent individual wells in a well plate.

5. The device of claim 1, wherein the reservoirs are substantially acoustically indistinguishable.

6. The device of claim 1, wherein the reservoirs are optically opaque.

7. The device of claim 1, wherein the reservoirs are sealed.

8. The device of claim 1, wherein the device comprises 96 reservoirs.

9. The device of claim 8, wherein the device comprises 384 reservoirs.

10. The device of claim 9, wherein the device comprises 1536 reservoirs.

11. The device of claim 10, wherein the device comprises 3456 reservoirs.

12. The device of claim 11, wherein the device comprises 10,000 reservoirs.

13. The device of claim 12, wherein the device comprises 100,000 reservoirs.

14. The device of claim 13, wherein the device comprises more than 500,000 reservoirs.

15. The device of claim 1, wherein at least one reservoir is constructed to contain no more than about 1 mL of fluid.

16. The device of claim 15, wherein at least one reservoir is constructed to contain no more than about 1 μL of fluid.

17. The device of claim 16, wherein at least one reservoir is constructed to contain no more than about 1 nL of fluid.

18. The device of claim 1, wherein at least one reservoir contains a fluid.

19. The device of claim 18, wherein the at least one of the reservoirs contains an aqueous fluid.

20. The device of claim 18, wherein the at least one of the reservoirs contains a nonaqueous fluid.

21. The device of claim 20, wherein the nonaqueous fluid comprises an organic solvent.

22. The device of claim 18, wherein the fluid contains a biomolecule.

23. The device of claim 18, wherein the fluid is at least partially frozen.

24. The device of claim 1, wherein at least one reservoir contains a substance capable of existing as a fluid at a temperature of about 0°C to about 100°C.

25. The device of claim 1, further comprising a means for altering the relative position of the analyzer with respect to the reservoirs.

26. The device of claim 1, wherein the analyzer is positioned in fixed alignment with respect to the acoustic radiation generator.

27. The device of claim 1, wherein the analyzer is positioned to receive acoustic radiation reflected from a free surface of a fluid contained in a reservoir.

28. The device of claim 1, wherein the acoustic radiation generator comprises a component common to the analyzer.

29. The device of claim 28, wherein the component common to the acoustic radiation generator and the analyzer is a piezoelectric element.

30. The device of claim 1, wherein the analyzer is adapted to analyze a characteristic of acoustic radiation to determine the volume of fluid in each reservoir.

31. The device of claim 1, wherein the analyzer is adapted to analyze a characteristic of acoustic radiation to determine a property of the fluid in each reservoir.

32. The device of claim 31, wherein the property is viscosity.

33. The device of claim 31, wherein the property is surface tension.

34. The device of claim 31, wherein the property is acoustic impedance.

35. The device of claim 31, wherein the property is acoustic attenuation.

36. The device of claim 31, wherein the property is solid content.

37. The device of claim 31, wherein the property is impurity content.

38. The device of claim 1, wherein the characteristic is the intensity of the acoustic radiation.

39. The device of claim 1, wherein the characteristic is the wavelength of the acoustic radiation.

40. The device of claim 1, wherein the acoustic generator represents a component of an acoustic ejector for ejecting droplets from the reservoirs.

41. The device of claim 40, further comprising a focusing means for focusing the acoustic radiation generated by the acoustic generator.

42. The device of claim 41, wherein the focusing means is adapted to focus the acoustic radiation according to the results of acoustic analysis performed by the analyzer.

43. The device of claim 1, further comprising a storage means for storing the results of acoustic analysis performed by the analyzer.

44. The device of claim 43, wherein the storage means comprises rewritable data storage media.

45. The device of claim 43, wherein the storage means comprises permanent data storage media.

46. The device of claim 43, further comprising the results of acoustic analysis performed by the analyzer stored in the storage means.

47. The device of claim 1, further comprising a temperature control means for controlling the temperature of the reservoirs.

48. A method for acoustically assessing the contents of one or more reservoir, comprising the steps of:

(a) selecting a reservoir from a plurality of reservoirs each comprising a solid surface, wherein a portion of each reservoir is adapted to contain a fluid;

(b) positioning an acoustic radiation generator in acoustic coupling relationship to the selected reservoir;

(c) actuating the acoustic radiation generator to generate acoustic radiation so that the generated acoustic radiation is then transmitted through the solid surface and through the portion of the selected reservoir adapted to contain a fluid to an analyzer capable of analyzing a characteristic of the transmitted radiation, the characteristic corresponding to a property of the of the contents of the selected reservoir; and

(d) operating the analyzer to analyze the characteristic of the transmitted acoustic radiation.

49. The method of claim 48, further comprising repeating steps (b), (c), and (d) for the remaining reservoirs.

50. The method of claim 49, wherein the contents of the reservoirs are analyzed at a rate of at least about 96 reservoirs per minute.

51. The method of claim 50, wherein the contents of the reservoirs are analyzed at a rate of at least about 384 reservoirs per minute.

52. The method of claim 51, wherein the contents of the reservoirs are analyzed at a rate of at least about 1536 reservoirs per minute.

53. The method of claim 52, wherein the contents of the reservoirs are analyzed at a rate of at least about 3456 reservoirs per minute.

54. The method of claim 53, wherein the contents of the reservoirs are analyzed at a rate of at least 10,000 reservoirs per minute.

55. The method of claim 48, further comprising, after step (a), step (a') dispensing a quantity of fluid from the reservoir.

56. The method of claim 55, wherein step (a') is carried out before step (d).

57. The method of claim 56, further comprising, during or after step (d), step (e) determining the quantity of fluid dispensed from the reservoir using the analyzed characteristic of step (d).

58. The method of claim 55, wherein step (a') is carried out after step (d).

59. The method of claim 55, wherein steps (a') and (d) are carried out simultaneously.

60. The method of claim 55, wherein step (a') is carried out through acoustic ejection.

61. The method of claim 55, wherein step (a') is carried out after sufficient time has passed to allow for the contents of the reservoir to melt.

62. The method of claim 48, wherein step (b) comprises positioning the acoustic radiation generator such that acoustic radiation generated by the acoustic generator is directed toward a free surface of a fluid within the reservoir.

63. The method of claim 48, further comprising, after step (d), step (e) correlating the characteristic to the volume of the contents in the reservoir.

64. The method of claim 48, further comprising, after step (d), step (e) correlating the characteristic to a property of the contents in the reservoir.

65. The method of claim 64, wherein the property is viscosity.

66. The method of claim 64, wherein the property is surface tension.

67. The method of claim 64, wherein the property is acoustic impedance.

68. The method of claim 64, wherein the property is solid content.

69. The method of claim 64, wherein the property is impurity content.

70. The method of claim 48, where step (d) comprises measuring the travel time of the acoustic radiation transmission through the reservoir.

71. The method of claim 48, wherein step (d) comprises determining the difference between the generated and transmitted acoustic radiation.

72. The method of claim 71, wherein step (d) comprises analyzing the difference in the intensity between the generated and transmitted acoustic radiation.

73. The method of claim 71, wherein step (d) comprises analyzing the difference in the intensity between the generated and transmitted acoustic radiation.

74. The method of claim 48, further comprising (e) storing the results of the acoustic analysis performed by the acoustic analyzer.

75. The method of claim 48, further comprising, during any of steps (a), (b), (c), and (d), ensuring that the contents of the reservoirs are not exposed to optical radiation.

76. The method of claim 48, wherein each of steps (a) (b), (c), and (d) are carried out while the reservoirs are in a sealed state.

77. A method for accurately dispensing fluid from a reservoir, comprising the steps of:

(a) positioning an acoustic radiation generator in acoustic coupling relationship to a reservoir selected from a plurality of reservoirs, wherein a portion of each reservoir is adapted to contain a fluid;

(b) transmitting acoustic radiation generated by the acoustic radiation generator through at least the portion of the selected reservoir adapted to contain a fluid;

(c) analyzing a characteristic of the transmitted acoustic radiation; and

(d) dispensing fluid from the selected reservoir according to the analysis of the characteristic of the transmitted acoustic radiation..

78. The method of claim 77, wherein step (d) is carried out through acoustic ejection.

79. The method of claim 77, wherein steps (a), (b), (c), and (d) are repeated for another reservoir selected from the plurality of reservoirs.

80. In a device for dispensing one or more fluids from a plurality of reservoirs each having a portion adapted to contain a fluid, the improvement comprises providing:

an acoustic radiation generator for generating acoustic radiation;

a means for positioning the acoustic radiation generator in acoustic coupling relationship to each reservoir such that acoustic radiation generated by the acoustic radiation generator is transmitted through at least the portion of each reservoir adapted to contain a fluid; and

an analyzer for analyzing a characteristic of acoustic radiation,

wherein the analyzer is positioned to receive the transmitted acoustic radiation.

81. The device of claim 80, wherein the acoustic radiation generator represents a component of an acoustic ejector.

82. The device of claim 81, wherein the acoustic radiation generator comprises a component common to the acoustic analyzer.

83. The device of claim 82, wherein the component common to the acoustic radiation generator and the acoustic analyzer is a piezoelectric element.